

Full Length Research Paper

Representing a combination algorithm (AHP and Kano) in order to priority effective factors on customer needs in e-banking: The case of Bank-e-Saderat of Tehran Province

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This paper intends to present a combined algorithm proposed by Kano and data hierarchical analysis to prioritize indicators affecting customers' needs in electronic banking because implementation of customer's satisfaction measurement and survey as the most important indicator in performance improvement is considered an essential prerequisite for modern organizations in banking industry. Hence, in this research, for conceptualization of relationship between customers' satisfaction and needs and evaluation of service quality, Kano's model was used and in order to compensate for this model's qualitative weak point, phased hierarchical analysis technique was employed. Thus, in order to show the effectiveness of this model, an investigative type of research aimed to identify prioritization of Bank-e-Saderat electronic banking customers' needs in Tehran Province was carried out. For this purpose, a questionnaire comprising 18 questions with stability coefficient of 0.81 was designed which has been completed by 454 customers of Bank-e-Saderat's first grade branches in Tehran Province. The obtained results confirmed the reliability of the above model and indicated that services' high security and assurance in must classification, easy and online access to different accounts in performance classification, possibility of installment payment through automatic money dispensers in attractiveness classification are among customers' first priority. And other needs in each class are respectively placed in next priorities.

Key words: Service quality, customer's satisfaction, e-banking, Kano's model, phased hierarchical analysis process.

INTRODUCTION

In recent years, due to the depth of technological changes by electronic business, goods trade's monetary payments and service offering have been observed to be carry out through electronic systems connections (Joeiqui et al., 2010). This has resulted in public welfare improvement and rise in standard of living in various societies as well as increased customers' awareness and expectations.

Today, in the world of business, management recognizes the principle that customers are the main axis of business and company's success depends on improvement of managerial relationships. Therefore, the importance of customer's satisfaction and customer retention in strategy formulation for customer-oriented and market-oriented enterprises cannot be under-estimated. Hence, banking like other industries, is faced with new technologies, market rapid change, economic indefiniteness, intense competition, customers' diverse needs and changing atmosphere which give rise to a series of unprecedented challenges (Kumar, 2008). The enterprises which compete for the market hegemony, constantly seek ways

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for surpassing their competitors. Successful management of relationship with customer is one of the major competitive advantages which can help companies prevent switching of customers to other companies (Kimiloglu, 2009).

Since the issue of customers' need is very crucial, numerous approaches and tools have been developed which consequently help companies achieve a better understanding of customers' needs, among which Kano's Model which in the customer's competitive analysis has been registered as a qualitative tool to help correct and profound understanding of voice of customer (VOC) and its effect on customers' satisfaction (Yanlai et al., 2009).

Based on this concept, Kano's model analyzes customers' needs and examines effective tools in understanding the customer's taste and based on data analysis divides the needs in to three groups of required, functional, and attractive. Kano's model explains different relationships, particularly non-linear relationships between customers' needs and customers' satisfaction (Tingand, 2009). However, this model is not equipped with quantitative tools and is not able to reflect the existing differences between needs in one group. Hence, to resolve this shortcoming, many researches have been done including a research by Qianlix et al. (2009) under title of "Kano's model analysis for analysis of customer's needs". In this research, they recommended a Kano model which emphasizes on customer's need (interaction between production area and customer area) and by adopting quantitative measures and sensitivity analysis circular process, they extended Kano's traditional method and allowed producer to plan and manage production stages. Wang and Jee (2010) in an article titled "understanding customers' needs through quantitative analyses and Kano's model" tried to measure customers' satisfaction. Ting and Ping (2009) in an article under title of "understanding customers' needs through Kano's model quantitative analysis" in which Kano's model was combined with mathematical tools and a series of linear and non-linear relations were used to measure the effect of customers' diverse needs on the customer's satisfaction. In this study, to resolve qualitative shortcoming and inability for prioritization of needs in each class, Kano's model with fuzzy hierarchical analysis technique was combined. To show the effectiveness of this model, a case study for identification of customers' needs for electronic banking quality was carried out.

THEORETICAL BACKGROUNDS

Service quality

Early studies on service quality in 1920s were concentrated on evaluation of production quality and assemblage industries. Since service activities have been transformed into essential and principal factors during

three decades, study on service quality has been expanded. This study shows that service quality is a key factor for surviving the competition (Chin-Yi and Chung-Shan, 2010).

Service sector in recent years has had significant growth so as its share of global gross production has been greater than other sectors. Obviously, main courses in second half of twentieth century have led to transition of economy from industrialism to service-orientation (Hutt and Speh, 2007). Service quality may have different meanings. Several specialists have defined it based on various premises (Jeoung et al, 2010). Keillor et al, (2004) considered service quality as organization's constant focus on meeting customers' needs and requirements. Zeithaml (1988) has defined service quality as "customer's judgment about service general or relative superiority. With regard to service quality, two models enjoy a greater popularity:

1. Service quality model including such dimensions as tangibility, reliability, responsiveness, guarantee and intimacy (Parasuraman et al., 1985).
2. Performance service quality including technical and performance quality (Gronroos, 1984).

Therefore, the importance of service quality lies in the fact that the desire to offer quality service plays a critical role in service industries such as insurance, banking and similar services. In fact, today, customer's satisfaction and service quality are considered as vital issues in most service industries. This issue particularly in financial services in which generally service differentiation is difficult is of greater importance (Stafford et al., 1998).

Customer's satisfaction

Several studies have investigated the issue of satisfaction and have regarded it as an effective structure, and not a cognitive structure (Vase, 2010) and the concept regarding customer's satisfaction and its measurement for the first time in 1977 was introduced by Oliver. Vase (2010) considered customer's satisfaction as customer's satisfaction reaction, degree of satisfaction or undesirability which indicates service performance effect on customer's feeling state (Vase, 2010). Hence, the most widely accepted theory for explanation of customer's satisfaction is Luwin's disapproval-expectation theory (Jooyeon and Soocheong, 2010).

Customer's satisfaction has direct effect on banks' profitability, driving away customers from competitors, persuasion of transaction repetition, improvement and enhancement of reputation, reduction in costs of new customers' attraction and obtaining competitive advantage. This matter requires that the organizations active in banking industry to have increasing focus on customers' satisfaction and application of customer-

orientation strategy (Fen and Lian, 2008).

E- banking

E- banking is a kind of banking service which for the first time in 1995 was used in the US and shortly afterwards it became widely in use in developed countries and later on gradually found its way in to the developing countries (Wendy et al., 2005). E-banking is an inseparable part of e-business with a critical role in its application. The most evident presence of e-business is seen in banking area and financial services (Yousafzai et al., 2003).

On the other side, Internet banking allows banks to operate in new geographical regions, new markets and new production domain (Yiu et al., 2007). In other words, with e-banking, customers are able to easily carry out banking operation beyond the usual working hours and without physical presence in bank's branch (Yiu et al., 2007). In this case, money completely finds an electronic and intangible quality and interaction tool between the two parties, that is, the customer and the bank (Amadeh and Jafarpor, 2007).

Kano's model

One of the economic methods to achieve customers' satisfaction in competitive analyses in order to help correct and profound understanding the nature of Voice of Customer is Kano's model which has been registered (Yanlai et al., 2009). Kano's model for the first time in 1979 was presented by professor Nurbaki, a lecturer at Rika University in Japan and later on, he succeeded in receiving Deming Award. Kano's model is used for the classification of product based on understanding customer's wishes and the way it affects customer's satisfaction. In fact, Kano's diagram shows customers' satisfaction in relation to production level and qualitatively evaluates products (Wassenaar et al., 2005; Riviortal, 2006). Kano believes for customer's satisfaction, organizations should make sure that the way of securing customers' requirements affects their satisfaction and products and services should meet all of the three customers' requirements and not only what the customer states. Kano divided these requirements in to three groups (Chun, 2008), and Figure 3 shows a better conception of these requirements provided.

Expected (essential) requirements

The first group of the characteristics, are essential needs which in Kano's view, the inclusion of which in the product, only prevents the customer's dissatisfaction and does not result in a particular satisfaction and content in customer. In other words, full gratification of product's

essential requirements, only prepare the ground for presence of product in the market and for triumph over competitors and taking control of the product's market does not offer us any help. The customer supposes that these characteristics in product have been included in the product and in other words, these needs are unspoken and implicit.

Performance requirements

The second group of qualitative characteristics is product's performance requirements the non-gratification of which causes customers' dissatisfaction and in contrast, full and proper gratification of them will result in the customer's satisfaction. The importance of product's performance requirements is in their identification, and inclusion in product at least is an effort which protects organization's commercial position in the competitive market.

Attractive requirements

Detection and specification of these requirements is difficult because they are beyond customers' expectations and hence, their absence will not cause dissatisfaction, but their presence excites the customer.

Kano's model examination

By taking customers' condition into consideration in Kano's model, there is a series of questionnaires which assess customers' condition, and the responses given by customers are analyzed and presented in Table 1.

Fuzzy hierarchical analysis

Figure 1 shows the decision making process in AHP inside a modified hierarchical structure. As a result, each line of hierarchical levels in AHP uses paired comparative judgments and algebraic matrix for identification and estimation of relative priorities from the criteria and options (Saaty, 1992).

But AHP is not able to calculate the uncertainty in the time of problem evaluation and solution. To solve these problems, the extended model of AHP, that is, fuzzy analysis of hierarchical process (FAHP) has been suggested. This method first, transforms inaccurate and vague concepts and variable in to mathematical form and then, it prepares grounds for reasoning and decision making in uncertainty condition. FAHP using fuzzy scales with high, medium and low values resolves more efficiently the problem of ambiguous and unclear decisions (Seongkon et al., 2010). Fuzzy numbers are

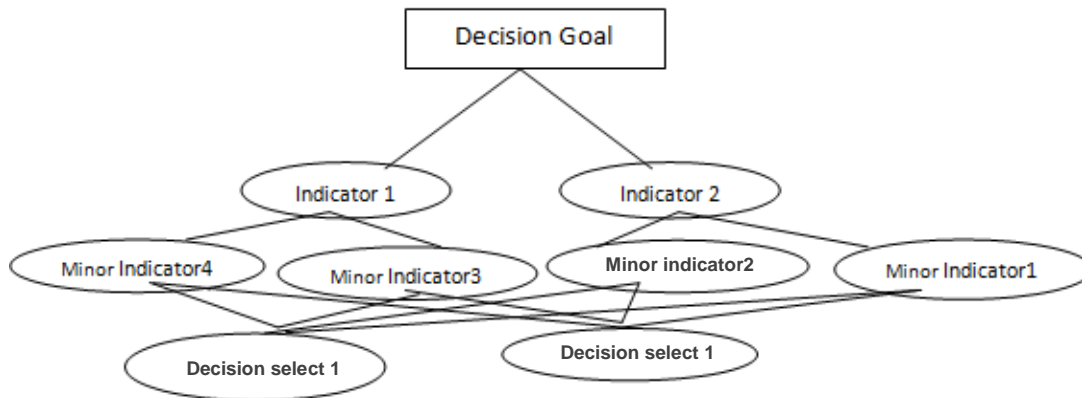


Figure 1. Hierarchical representation of decision issue.

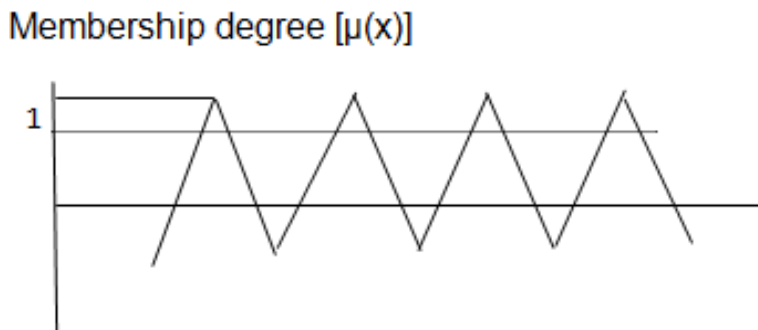


Figure 2. Transformation of lingual words into fuzzy numbers.

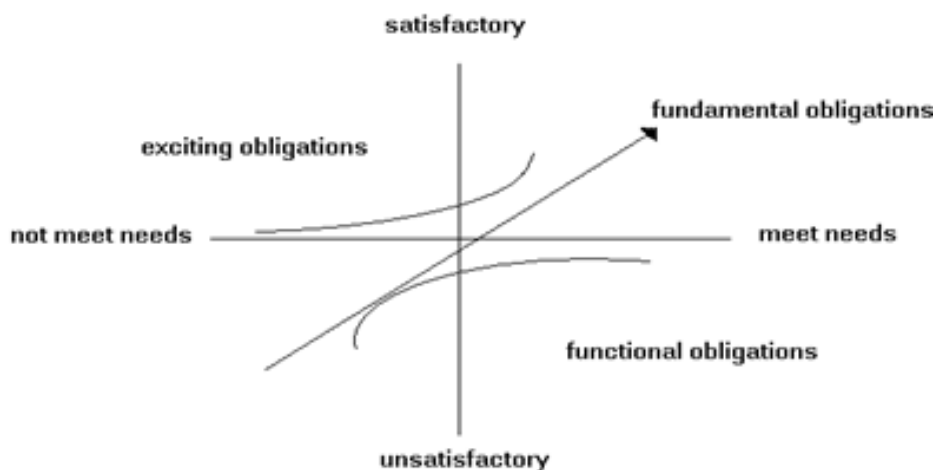


Figure 3. Kano model (Chun et al., 2008).

made of membership and sets functions of the used fuzzys in FAHP weights using AHP nine-point scale Figure 2. Although, FAHP needs heavy computational process, it is more systematic than other MCDM

methods. FAHP takes possession of paired comparisons of options, criteria, ambiguity and unclearness of human assessments. Table 2 shows paired comparison of fuzzy scales used. The used phases for FAHP are as follows:

Table 1. Evaluation table of undesirable customers' requirements results.

	Customers needs	Have a lot of positive effect	Have positive effect	without effect	Have negative effect	Have a lot of negative effect
Suitable	Have a lot of positive effect	Q	A	A	A	Q
	positive effect	R	I	I	I	M
	without effect	R	I	I	I	M
	negative effect	R	I	I	I	M
	a lot of negative effect	R	R	R	R	Q

R, Reversed; Q, dubitable; I, insignificance; M, obligation; A, absorb; O, one-dimensional (Qianli Xu et al., 2009).

Table 2. Trilateral fuzzy numbers.

Linguistic variables	Trilateral fuzzy numbers
Identical / similar	(1, 1, 1)
Few / little	(2.3, 1, 3.2)
Much	(3.2, 2, 5.2)
Very much	(5.2, 3, 7.2)
Completely	(7.2, 4, 9.2)

First step: Formation of paired comparisons combinatory matrix

$$E_{ij} = \frac{1}{m} \times (E^1_{ij} + E^2_{ij} + \dots + E_{ij}) \tag{1}$$

Where E_{ij} is general assessment of individual, I , in terms of j -index and m is number of evaluators.

Second step: For each line of paired comparisons matrix, value of S_k which itself is a triangular number is calculated as follows:

$$S_k = \sum_{j=1}^n M_{kj} \times \left[\sum_{i=1}^m \sum_{j=1}^n M_{ij} \right]^{-1} \tag{2}$$

Where k indicates the line's number and I and j , represent options and indices, respectively.

Third step: Calculation of S_k s magnitude degree relative to each other.

$$\begin{cases} v(M_1 \geq M_2) = 1 \\ v(M_1 \geq M_2) = hgt(M_1 \cap M_2) \end{cases} \text{ if } M_1 \geq M_2 \tag{3}$$

Also, we have:

$$hgt(M_1 \cap M_2) = \frac{u_1 - l_2}{(u_1 - l_2) + (m_2 - m_1)} \tag{4}$$

Magnitude of triangular fuzzy number from k other triangular fuzzy numbers is obtained from the below relation:

$$v(M_1 \geq M_2 \dots M_k) = \min [v(M_1 \geq M_2), \dots, v(M_1 \geq M_k)] \tag{5}$$

Fourth step: Calculation of indices' weight in paired comparison matrix.

Fifth step: Obtaining abnormal weights;

$$w^{\circ(x_i)} = \text{Min} \{v(s_1 \geq s_k)\}, \quad k = 1, 2, \dots, n, \quad k \neq i \tag{6}$$

Normalization of abnormal coefficients vector (W') in order to obtain weights' normal vector (Lee et al., 2007, 2009).

$$w^{\circ} = [w^{\circ}(c_1), W^{\circ}(c_2) \dots W^{\circ}(C_n)]^T$$

Sixth step: calculation of incompatibility degree

A. First, we de-fuzzy the paired comparisons table through method of area center.

$$CA = \frac{(c - a) + (b - a)}{3} + a$$

B. Multiplication of de-fuzzy matrix by vector of relative weights

$$WSV = D \times W$$

C. Calculation of compatibility vector (CV): Quotient of WSV on vector of indices' relative weights

D. Calculation of λ_{max} : Arithmetic mean of compatible vector's elements

Table 3. Random incompatibility index.

N	1	2	3	4	5	6	7	8	9	10
IRI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.51

Table 4. General information of respondents.

Gender	Man: 326 Woman: 116
Age	97: 18-30 years 170: 31-40 115: 41-50 60: 51 years and higher
Education	High school diploma and lower: 65 Junior college diploma: 118 Bachelor degree: 240 M.Sc. and M.A. and higher: 19
Occupation	Public service: 204 Self-employment: 112 Student: 62 Housewife: 34 Other: 30
Income	300000 Tomans and less: 26 301-500 thousands Tomans: 201 501-700 thousands Tomans: 196 701000 and higher: 19

E. Calculation of incompatibility index (II):

$$II = \frac{\lambda_{max}}{n - 1}$$

F. Calculation of compatibility rate:

$$IR = \frac{II}{IRI}$$

As shown in table 3 if the incompatibility rate is less than or equal to 0.10 ($IR \leq 0.10$), there is compatibility in paired comparisons and we can continue the work. Otherwise, decision maker should reconsider the paired comparisons.

RESEARCH METHODOLOGY

In the present research, in terms of purpose is of applied type and in terms of nature and method is of descriptive-survey type.

After study of library sources and articles, interview with customers, experts and connoisseurs and examination of customers' complaints, a questionnaire including 18 questions with regard to measurement of customers' requirements from electronic banking service quality has been obtained with stability coefficient. Using SPSS software, it is designed and given to the bank's customers.

The obtained responses from the questionnaire after analysis using Kano's assessment table were divided into three, that is, mandatory, attractive and performance groups. In the second stage, hierarchical analysis questionnaire for prioritization of requirements in each group was designed and provided to Bank-e-Saderat's experts. Analysis of the obtained responses from the second questionnaire using data hierarchical analysis technique and fuzzy hierarchical analysis has led to requirements prioritization in each group.

Population and sample

Population refers to all group, people and events or things which have at least one attribute in common. In this society, statistical society includes all the customers who constantly use Bank -e-Saderat electronic banking services in different branches. Cluster sampling method is used for selection of branches, so that from 551 existing branches in Tehran Province 50 first-grade branches were selected. Customers of electronic banking were selected by interview. A sample size of 454 persons using the following formula (Equation 7) was obtained.

$$n = \left(\frac{t \cdot \sigma}{\varepsilon} \right)^2 \quad (7)$$

With regard to the research's validity and stability, the necessary tests and examinations were performed and a Cronbach's alpha of 0.91 was obtained, indicating the validity of the equation.

EMPIRICAL RESULT

From 454 questionnaires which were distributed between bank's customers, 442 questionnaires were usable. Table 4 shows the demographic attributes of Kano's questionnaire's respondents analyzed.

Data analysis using Kano's model

To analyze the data obtained from the questionnaire, in the first step, Kano's method of information analysis, descriptive and inferential statistics was used. The obtained data from this step which are gathered by Kano's method examined the effect of each one of the 18 factors on customers' satisfaction and classifies these factors into three groups of mandatory, one-dimensional

Table 5. Hierarchical structure of the criteria concerning customers' needs.

Prioritization of electronic banking customers' needs		
Mandatory requirements	Performance requirements	Attractive requirements
High reliability and accuracy of electronic banking services	Easy and online access to the bank's different services	Possibility to calculate interest of facilities and deposits
High security and guarantee of services	Offering diverse banking services such as ticket reservation etc	Possibility for registration and underwriting such as Mecca pilgrims registration and shares subscription through Internet
Easy purchase through POS	Possibility of balance inquiry and receiving account statement via telephone-bank	Possibility for payment of installments via ATM
Access to electronic banking services at any time	Possibility to receive account balance and statement via SMS	Possibility to receive foreign exchange via ATM
Reduction in time and cost in use of electronic banking services	Receiving account statement via e-mail	Possibility for travel insurance and medical costs by national international card
	Possibility to open account and to pay bills through telephone-bank	
	Expressing complaints and offering suggestions via Internet	
	Possibility to transfer funds to other banks through POS	

and attractive (Table 5).

With a little contemplation in results of Table 5, it was seen that instances which concern customers' security and accuracy fall within class of mandatory requirements and as the services become more advanced and newer or use of them requires more skills and training, we observed these requirements in one-dimensional or attractive classification.

Prioritization of requirements using fuzzy analysis of hierarchical process (FAHP)

For ranking the existing requirements in each class, paired comparisons were designed and offered to 5 experts of Road Maintenance and Passengers Road Transportation Organization. Next, the obtained responses from FAHP questionnaire were analyzed. The obtained results from prioritization of the existing criteria and requirements in each class are presented in Table 6. Since in the above matrix $IR = 0.04$, we concluded that in paired comparison of criteria, there is an acceptable compatibility. Results obtained from FAHP method indicated that mandatory criterion is of more importance relative to other two criteria.

Since in Table 7, $IR = 0.66$, we concluded that in paired comparisons of mandatory requirements, there is an acceptable compatibility. Results obtained from FAHP method suggested that high security and guarantee of services have the highest rank and other mandatory criteria are ranked next.

Since in Table 8 $IR = 0.09$, we concluded that in paired comparisons matrix of performance requirements, there is an acceptable compatibility. Results obtained from FAHP method suggests that easy and online access to various bank accounts has the highest rank and other criteria are ranked next.

Since in Table 9 $IR = 0.087$, we concluded that in paired comparisons matrix of attractive requirements, there is an acceptable compatibility. Results obtained from FAHP method suggested that possibility of paying installments via ATMs has the highest rank and other attractive requirements criteria are ranked next.

Conclusion

Firstly, in using Kano's model, all customers' needs were divided into three groups of mandatory, performance and attractive. Next, using fuzzy hierarchical analysis

Table 6. Ranking of electronic banking services' sub-criteria in FAHP environment.

W_{FAHP}	Attractive	Performance	Mandatory	
0.543	(2.7, 3.2, 3.7)	(1.3, 1.6, 2)	(1, 1, 1)	Mandatory
0.321	(2.1, 2.6, 3.1)	(1, 1, 1)	(0.62, 0.77, 1.02)	Performance
0.136	(1, 1, 1)	(0.34, 0.4, 0.52)	(0.3, 0.33, 0.43)	Attractive

$\lambda = 3.05$, $II = 0.02$, $IR = 0.04$.

Table 7. Ranking of electronic banking services' mandatory requirements sub-criteria in FAHP environment.

Row	Criterion	Weight
1	High security and guarantee of services	0.47
2	Reliability and accuracy of electronic banking services	0.36
3	Less time spending and lower cost of electronic banking system	0.084
4	Access to electronic banking services at any time	0.063
5	Selling and easy purchase in stores via POS terminals	0.023

Table 8. Ranking of electronic banking services' performance requirements sub-criteria in FAHP environment.

Rank	Performance requirements	Weight
1	Easy and online access to various bank accounts	0.275
2	Possibility to open account and to pay bills via telephone-bank	0.195
3	Possibility of balance inquiry and receiving account statement via SMS	0.157
4	Possibility of balance inquiry and receiving statement via telephone-bank	0.143
5	Receiving account statement via e-mail	0.076
6	Possibility of fund transfer to other banks through point of sale (POS)	0.066
7	Provision of diverse banking services such as ticket reservation via Internet	0.066
8	Expressing complaints and suggestions via e-mail	0.032

Table 9. Ranking of electronic banking services' attractive requirements sub-criteria.

Rank	Criteria	Weight
1	Possibility of paying installments via ATM	0.327
2	Possibility of travel insurance and medical costs by national international card	0.263
3	Possibility of receiving foreign currency via ATM	0.246
4	Possibility of registration and subscription such as Mecca pilgrims registration and shares underwriting via Internet	0.135
5	Possibility of bank's facilities and deposits interest calculation via SMS	0.029

technique each requirement for prioritization was identified in each class. After specification of the existing priority in each class, final ranking of customers' requirements was determined and the obtained results from final prioritization of customers' requirements are presented in Table 10.

The obtained results showed that security indices relative to other indices are of more importance for customers and this corresponds to reality. In addition, it was found that most of the services from customers' point of view which were placed in class of mandatory requirements, in experts' view are of a higher priority.

Table 10. Ranking of electronic banking services sub-criteria based on FAHP.

Rank	Criteria	Weight
1	High security and guarantee of services	0.254
2	High reliability and accuracy of electronic banking services	0.195
3	Easy and online access to various bank accounts	0.079
4	Possibility of opening account and paying bills via telephone-bank	0.056
5	Possibility of paying installments via ATMs	0.055
6	Possibility of balance inquiry and receiving account statement via SMS	0.046
7	Less time spending and lower cost of electronic banking system	0.045
8	Possibility of travel insurance and medical costs by national international card	0.044
9	Possibility of receiving foreign currency via ATM	0.043
10	Possibility of balance inquiry and receiving statement via telephone-bank	0.042
11	Access to electronic banking services at any time	0.035
12	Possibility of registration and subscription such as Mecca pilgrims registration and shares underwriting via Internet	0.024
13	Receiving account statements via e-mail	0.023
14	Possibility of fund transfer to other banks through point of sale (POS)	0.017
15	Provision of diverse banking services such as ticket reservation via Internet	0.016
16	Easy purchase from shops through Points of Sale (POS)	0.012
17	Expressing complaints and suggestions via e-mail	0.01
18	Possibility of bank's facilities and deposits interest calculation via SMS	0.004
Total weight		1

REFERENCES

- Amadeh H, Jafarpor M (2007). Traditional banking and costs imposed on the customer. *Manage. Dev.*, pp. 10-17.
- Chin-Yi TC, Chung-Shan R (2010). Fuzzy application in service quality analysis: An empirical Hung-Tso Lin., pp. 517-526.
- Chun CM (2008). Integration the Kano model into a robust design approach to enhance customer satisfaction with product design. *Int. J. Prod. Econ.*, pp. 667-681.
- Fen YS, Lian KM (2008). Service quality and customers satisfaction : Antecedents of customers re –patronage intentions. *Sunway Acad. J.*, (4)1.
- Gronroos C (1984). A Service Quality Model and Its Marketing Implications", *Eur. J. Mark.*, pp. 36-44.
- Hutt MD, Speh TW (2007). *Business Marketing Management*“, Thomson, Landan.
- Jeoung-Hak L, Hyun-Duck K, Yong J, Michael S (2010). The influence of service quality on satisfaction and intention: A gender segmentation strategy.
- Jooyeon H, Soochong SJ (2010). Effects of service quality and food quality: The moderating role of atmospherics in an ethnic restaurant segment. *Int. J. Hospitality Manage.*, 29: 520-529.
- Kumar R (2008). Customer satisfaction in Indian banking: A case of Yamuna Nagar District in Haryana. *Political Economy Journal India.*
- Kimiloglu H, Zarali H (2009). What signifies success in e-CRM? *Mark. Intell. Plan.*, 2(27): 246-267.
- Keillor B, Hult GT, Kandemir D (2004). A study of the service encounter in eight counties. *J. Int. Mark.*, 12(1): 9-35.
- Lee SK, Yoon YJ, Kim JW (2007). A study on making a long-term improvement in the national energy efficiency and GHG control plans by the AHP approach. *Energy Policy*, pp. 2862-2868.
- Parasuraman A, Zeithaml VA, Berry LL (1985). A conceptual model of service quality and its implications for future research. *J. Mark.*, 49: 41-50.
- Qianlix RJ, Jiao XY, Martin H, Halimahtun MK, Anders O (2009). An analytical Kano model for customer need analysis, pp. 87-110.
- Saaty TL (1992). How to make a decision: The analytic hierarchy process. *Eur. J. Oper. Res.*, 48: 9-26.
- Seong KGM, Sang KL, Hui KS, Jongwook K (2010). Econometric analysis of the R&D performance in the national hydrogen energy technology development for measuring relative efficiency : The fuzzy AHP/DEA integrated model. *Approach Int. J. Hydrogen Energy*, 35: 2236-2246.
- Ting W, Ping J (2009). Understanding customer needs through quantitative analysis of Kano's model. *Int. J. Qual. Reliab. Manage.*, 2(27): 173-184.
- Wendy WN, Wan CL, Cheris WCC (2005). Customers A doption of cchannels In hongkong. *Int. J. Bank Mark.*, 3(23): 255-275.
- Wassenaar HJ, Chen W, Cheng J, Sudjianto A (2005). Enhancing discrete choice demand modeling for decision-based design. *ASME J. Mech. Des.*, 127: 514-523.
- Yousafzai SY, Pallister JG, Foxall GR (2003). A proposed model of trust for electronic banking *Tecnovation*, 23: 847-860
- Yanlai L, Jiafu T, Xinggang L, Jie X (2009). An integrated method of rough set, Kano's model and AHP for rating customer requirements' final importance, pp. 7045-7053.
- Zeithaml VA (1988). Consumer perceptions of price, quality and value: a Means-End Model and synthesis of evidence. *J. Mark.*, 52: 2-22.
- Stafford MR, Thomas F, Stafford B, Wells P (1998). Determinants of service quality and satisfaction in the auto casualty claims process. *J. Serv. Mark.*, 12(6): 426-440.